DESCRIPTION

Clothing Material With Foamed Strand Welded Together Therein

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a clothing material in which a foamed net in a meshed shape that is constituted with a plurality of foamed strands intersected and simultaneously welded together at intersection points is inserted between a pair of outer clothes.

Description of the Prior Art

Textiles in which the above-mentioned foamed net in a meshed shape is contained as main material (textiles in which a foamed net is sandwiched between outer cloth made of synthetic fibers, such as nylon and Tetron, hemp, cotton etc., and lining cloth etc.) is lightweight, and excels in warmth retaining property. These textiles are commonly used in casual wear, life jacket (life vest), sportswear, etc. as is described in JP-A No. 10-202808. Foamed strand made of polyethylene, polystyrene, etc. is configured in a shape of a meshed shape, and then this foamed net obtained is welded and combined. These foamed nets are generally used to cover and protect soft and fragile materials, such as fruits and vegetables, or often used as cushioning materials serving for partitioning during transportation.

Moreover, what is disclosed in JP-A No. 11-5282 etc. is known as textile itself made of a foamed net as a main material. In the foamed net in this case, foamed strands having thin filament-like shape are arranged so that they may be mutually parallel at regular intervals, and then strands obtained are piled up to constitute a meshed shape. As a cross section form of the foamed strand, a round shape shown in Fig. 11 (a) and a flat elliptical shape (or oval shape) shown in Fig. 11 (b) are commonly used.

In a foamed net adopted in conventional textiles, foamed strands are configured in a meshed shape and clearance is formed among adjacent foamed strands so that the foamed net may have air layers that demonstrates warmth retaining property may be secured and as a result a lightweight net may be obtained simultaneously. Then, when more advanced warmth retaining property, cushioning property, and buoyancy are required, some means may be used in which foamed nets inserted into textiles are piled up to form double layer, or warmth retaining and heat insulating layers with different materials are further added, as is described in the above-mentioned official gazette (JP-A No. 11-5282). For example, when a foamed net is used as a material for life jacket, in order to acquire specific buoyancy, a plurality of foamed nets are used in laminated form in two or more layers, or a tubular-shaped net, often used for protection of fruits

etc, is used (referred to as "cap" in the case where it is used for fruits).

However, use of plurality of warmth retention and heat insulating layers, such as foamed net, increases both production process of textiles and materials, which causes an obvious cost rise. As a result, increase in process has a simultaneous fault of lengthening a lead-time in production line. Therefore, many improvements must be made in order to increase warmth retaining property, cushioning property and further buoyancy function effectively.

Then, in order to improve buoyancy and heat insulating function in the present foamed net, without two or more of lamination, as shown in Fig. 11 (b), it is proposed that intersection angle between upper and lower foamed strands s1 and s2 is made larger (or oblong section form may be adopted) so that a cross section form of welded foamed strands of s1 and s2 at intersection point k may have a shape of a long ellipse-like form with width w.

In this method, a cost rise and increase in weight are caused because the textiles become to have a large number of strands per unit area (or have a large volume per unit length of strand). Moreover, since a wide welded area at intersection point k induces a fall in flexibility and as a result many disadvantages are arisen, this method is difficult to be realized.

SUMMARY OF THE INVENTION

An object of the present invention is, in garments with foamed net used as a clothing material (inter-lining), to provide clothing materials that give a light-weight and easy-moving, and high warmth retaining property, high cushioning property and high buoyancy function without spoiling wearer's feeling in wear, and that do not give a cost rise or the above-mentioned disadvantages in production.

[Constitution and function]

Constitution of claim 1 shows that a clothing material in which a foamed net in a meshed shape being constituted with a plurality of foamed strands intersected and simultaneously welded together at intersection points is used by being inserted between a pair of outer clothes, wherein in the said foamed net the said foamed strands are welded together so that the said foamed strands have cross section forms with different ratios of height size to width size, and simultaneously the longitudinal direction of the cross section form has an angle of 45 to 90 degrees to a face of the net in a meshed shape.

According to constitution of claim 1, foamed strands having cross section forms of ellipse, or of Japanese hand

drum form, etc. with different ratios of height size to width size are welded so that a longitudinal direction of the cross section may have an angle of 45 to 90 degrees to a face of a net in a meshed shape. Thus a thickness of the foamed net increases and an amount of the foamed strands per unit volume of the foamed net decreases, as compared with a case where the longitudinal direction of the cross section may be parallel to the face of the net (oblong state) or with a case where the cross section form has a round shape. As a result, a clothing material is obtained that has a large amount of air layer in the net and that has a large amount of elastic deformation in a direction orthogonal or almost orthogonal to the face of the net.

And since a foamed net of the present invention has welded area equal to a conventional net with a circular cross section of foamed strands, flexibility as a clothing material is not impaired with very few cost rises. Therefore, warmth retaining property (heat insulating nature), buoyancy, flexibility and cushioning property sufficient as textiles are obtained only by one layer, even if foamed nets are not laminated double as is done before. Besides, since a laminating process is not required, excellent productivity (workability) may also be maintained.

In a constitution of claim 2, a cross section form of a foamed strand in the constitution of claim 1 is set as almost

elliptical. In a constitution of claim 3, a cross section form of the foamed strand in constitution of claim 1 is configured so that an end of a vertical line of character T may be aligned at the intersection point side.

When the cross section form is almost elliptical, a foamed strand volume per unit length decreases, and a clothing material with better function than is obtained in the constitution of claim 1 may be obtained. Moreover, in the case where the cross section form has a shape such that an end of a vertical line of character T may be aligned at the intersection point side, a clothing material may be manufactured having a function in which a contact point with an outer cloth forms a flat face and a shock of other things touched to the outer cloth is absorbed efficiently.

In a constitution of claim 4, a ratio of height size to width size of the foamed strand in the cross section form is set in a range of 1.1 or more and 4.0 or less, in the constitution of claims 1 to 3, and as is described in detail in preferred embodiments, the following functions are provided. That is, the foamed strand becomes to be deformed by compression in a cross section longitudinal direction (in a direction orthogonal or almost orthogonal direction to the clothing material i.e. the face of the net), without buckling of the foamed strand, when an external force against a body to be protected and covered by clothing material is given

on the clothing material, i.e., the foamed net. Consequently, a clothing material may be obtained in which outstanding cushioning property, based on the cross section form with bigger height size than width size of the foamed strand, is effectively demonstrated.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view showing a foamed net;

Fig. 2 is a plan view showing a cap for fruit;

Fig. 3 is a sectional view of a foamed net showing a cross section form of a foamed strand;

Fig. 4 is a sectional view of a foamed net showing another example of a cross section form of a foamed strand;

Fig. 5 is a view showing a form of a nozzle for molding a foamed strand shown in Fig. 3;

Fig. 6 is a view showing an inconvenient situation when using nozzle of Fig. 5;

Fig. 7 is a sectional view showing a form of a nozzle giving a cross section form of Fig. 3;

Fig. 8 is a view showing a form of a nozzle for molding a foamed strand shown in Fig. 4;

Fig. 9 is a sectional view in welded part showing another form of a foamed strand cross section;

Fig. 10 is a sectional view in welded part showing another form of a foamed strand cross section;

Fig. 11 is a sectional view showing a cross section form of a conventional foamed net;

Fig. 12 is a perspective view partially in section showing a conventional foamed net;

Fig. 13 is a sectional view showing a form of a conventional nozzle;

Fig. 14 is a perspective view showing a textile according to the present invention;

Fig. 15 is a sectional view showing a constitution of a textile shown in Fig. 14;

Fig. 16 is a referential figure showing a vest; and

Fig. 17 is a referential figure showing a jacket.

DETAILED DESCRIPTION OF THE INVENTION

Textile B that is an example of a clothing material according to the present invention is shown in Fig. 14, and the sectional view is shown in Fig. 15, respectively. Textile B has a three-layer structure in which a foamed net 1 is inserted as main material between outer materials (an example of outer cloth) 11, and lining cloth (an example of outer cloth) 12. The outer material 11 and the lining cloth 12 are made of synthetic fibers (nylon, Tetoron, etc.) and natural fibers, such as hemp, cotton, and olefinic foamed sheet and nonwoven fabric, etc. Three of the outer material 11, foamed net 1, and lining cloth 12 are combined with various

adhesives.

In textile B, a constitution in which a foamed net 1 is inserted into a sheet processed into a shape of a bag with outer clothes 11 and 12 made from the above-mentioned various materials of nylon etc., and a constitution in which textiles with a structure of each of these are processed by quilting processing may be used. As an example of use of clothes using these textiles B, sportswear, casual wear, life jacket (life vest), and others are mentioned. As examples for reference of the products using the textiles B in the present invention, a vest is shown in Fig. 16 and a jacket is shown in Fig. 17.

In addition, either an open cell or a closed cell may be used as a cell in a foamed material that constitute foamed strands s1 and s2 in case of a casual wear, and a closed cell is suitable in case of life jacket because it requires buoyancy.

Next, a foamed net 1 used for a textiles B as a main material will be explained in detail. A foamed net 1 is shown in Fig. 1, and a cap A for wrapping and protecting fruits etc. is shown in Fig. 2, respectively. A foamed net 1 has a structure of meshed shape in which a plurality of foamed strands s1 and s2 are mutually intersected, and the foamed strands s1 and s2 overlapped at intersection point k are welded together. When a foamed net 1 is connected in a loop to give a shape of a cylinder, a cap A is obtained. In some

cap A for wrapping and protecting fruits etc. as reference, an arranged pitch (refer to P of Fig. 12) of strands in the bottom of the cap A is set narrower than an arranged pitch in an upper, lower, and middle part of the net so that spreading caused by elastic deformation may not occur and that fruits etc. inside may not fall out from the bottom of the cap A.

As shown in Fig. 2 and Fig. 3, both the first foamed strand s1 and the second foamed strand s2 are elliptical, and have the same cross section form and size mutually, and each cross section form of foamed strands s1 and s2 has a different ratio S of height size to width size, and at the same time the first and the second foamed strands s1 and s2 are mutually welded so that a longitudinal direction of the cross section form orthogonally intersects to a face 2 of a net in a meshed shape. In the case of a cross section of elliptical shape, both of the first and the second line segment L1 and L2 that connect a welded section (welded point) u in an intersection point k and centroids g1 and g2 of a sectional views of each foamed strands s1 and s2 respectively are orthogonally configured to intersect to a face 2 of a net in a meshed shape.

In addition, foamed strands s1 and s2 may be welded so that a longitudinal direction of the cross section form may have an inclined state (refer to dashed line of Fig. 15) of

from 45 to less than 90 degrees to a face 2 of a net in a meshed shape. In this case, the said first and second line segments L1 and L2 have inclination corresponding to the angle of inclination.

A face 2 of a net represents a virtual plane made by a foamed net 1 put in a flat state and also represents a plane corresponding to a bottom plane of a flat plate put on the net 1. Moreover, when cap A is used for an object to be protected of the shape of a cylinder, such as wineglass, a cylindrical face is equivalent to a face 2 of a net. And a is a gap between adjacent strands and at the same time is an air layer (with gas permeability) to secure a buoyancy. In Fig. 3, a strand currently drawn on the upper position on drawing is the first foamed strand s1 in a side that touches outer material 11, and a strand currently drawn on the lower position is the second foamed strand s2 in a side that touches lining cloth 12. In case of a cap A, an outside strand is the first foamed strand s1, and an inside strand is the second foamed strand s2.

When a ratio S is defined as a ratio of height size to width size, H as height size and W as width size, in a cross section form of foamed strands s1 and s2, then S=H / W. In order to provide an excellent buoyancy, cushioning property, warmth retaining property, etc., S is preferably $1 < S < 5$ ($W < H < 5W$). Moreover, S is preferably set in a range of

$1.1 < S < 4.0$ ($1.1\ W < H < 4.0\ W$) so that foamed strands s1 and s2 are not buckled even if a force in a direction orthogonal or almost orthogonal to a face 2 of a net is given.

The reason is that when S is 1.1 or less excellent buoyancy, cushioning property and warmth retaining property are difficult to be obtained, and when S is 4.0 or more the foamed strands are possibly buckled. By setting S in a suitable range, deformation by compression is carried out in a longitudinal direction of a cross section without buckling of foamed strands s1 and s2, and as a result a textile B that also has an effective cushioning property may be obtained. In addition, more preferable value for acquiring effective buoyancy without buckling etc. is $1.5 < S < 2.5$ ($1.5\ W < H < 2.5\ W$).

Thus, by using foamed strands s1 and s2 with a long cross section in the direction of height, there is provided an advantage that warmth retaining property, buoyancy and cushioning property in a level obtained by conventional double cap may be obtained by single cap. In this case, when foamed strands s1 and s2 with a conventional circular cross section shown in Fig. 11 (a) are compared with the foamed strands s1 and s2 of the present invention with elliptical cross section shown in Fig. 3 on condition that both have the same buoyancy, cushioning property and warmth retaining property, the strands of the present invention require a

smaller cross-section area, and as a result lightweight is attained.

Moreover, a bigger cushioning property is naturally obtained in a foamed net 1 in which foamed strands s1 and s2 having a cross section form set in a ratio of height size to width size with larger height than width. However, since a contact area with an outer material 11 or lining cloth 12 is comparatively smaller than expected, the strand has a small contact frictional resistance to handle it easily in production process and also to increase in workability.

In order to prepare foamed strands s1 and s2 that have a cross section form of elliptical shape shown in Fig. 3, it is preferable to perform foaming using out and in nozzles 3 and 4 that have a form shown in Fig. 5 (nozzles 3 and 4 have the same form). In order to prepare foamed strands s1 and s2 that have Japanese hand drum type (gourd form) of cross section form shown in Fig. 4, it is preferable to perform foaming using out and in nozzles 5,6 with a form similar to gourd form shown in Fig. 8. Moreover, as long as foamed strands s1 and s2 with cross section form shown in Fig. 3 or Fig. 4 are obtained, nozzles with any form may be used.

By rotating nozzles 3 and 4 with form shown in Fig. 5, foamed strands s1 and s2 with a shape of almost elliptical shape inclined in the rotation direction, as shown by dashed line in Fig. 6, are obtained. The description above shows

that improvement of nozzle is required in order to set a degree α of an angle of inclination of foamed strands s1 and s2 to a face of a net 2 into 45 to 90 degrees.

Namely, when rotation is made to work using nozzles 3 and 4 shown in Fig. 5, it is necessary that adjustment is made so that the degree α of an angle of inclination to face 2 of a net of foamed strands s1 and s2 may be in a range of 45 to 90 degrees. For this purpose, out and in nozzles 7 and 8 with a form as shown in Fig. 7 (a) and out and in nozzles 9 and 10 with a form as shown in Fig. 7 (b) are used. It is possible to maintain the degree a of an angle of inclination of foamed strands s1 and s2 in the range of 45 to 90 degrees, by changing an angle θ of nozzles in Fig. 7. Rotation of nozzles 7, 8, 9, and 10 gives a product in which a cross section (almost elliptical cross section) with almost oval form is orthogonal to a face 2 of a net, as dashed line in Fig. 7 shows, and as a result, high cushioning property is demonstrated. Moreover, there is a tendency for cushioning property to be remarkably decreased if the degree α of an angle of inclination is less than 45 degrees.

The inclination may be cancelled by reduction of a value of a reverse angle θ, although a increase in rotation velocity of nozzles 7 and 8 enlarges inclination of strands. However, since the out nozzle 7 and in nozzle 8 rotates in the different direction mutually, decrease in adhesion strength of welded

part u may be sometimes induced based on a form of a product and on a time of contacting between the out nozzle 7 and the in nozzle 8 and on a kind of raw materials, etc. Especially adhesion strength in a side of the rotation direction of the nozzles 7 and 8 may be decreased.

Then, contact portions between the out nozzle 7 and 9 and the in nozzle 8 and 10 in a side of the rotation direction of the nozzles 7, 8, 9 and 10 are lengthened and expanded (portions shown in Fig. 7 with slash), as is represented by D in Fig. 7, so that an improvement in adhesive strength is obtained. In addition, a form like rectangle and trapezoid of the contact portion E may be adopted as a form of the contact portion D. It is preferable that a resin with large MFR, such as EVA, elastomer, metacelon resin, etc. is added in a raw material to improve adhesive property.

Closed cell or open cell is acceptable as air cells that constitute foamed strands s1 and s2. As a material for foamed strands s1 and s2, PVC, poly-olefinic resins, such as polyethylene and polypropylene, polystyrene derived resin, polyvinyl chloride derived resin, EVA, thermoplastic elastomer (TPE), metacelon resin, etc. are mentioned. For example, polyethylene and polypropylene are preferable.

Two or more kinds of resins may be mixed and used together. Moreover, in order to obtain improvement in processing when discarded, foamed strands of biodegradable

resins, such as poly lactic acid, starch synthetic macromolecule blended polymer, aliphatic polyester, polycaprolactone, cellulose, and PVA, and mixture of these resins may also be used. As cellular regulators, talc, inorganic foaming agent, and organic foaming agent are mentioned. As additives, antibacteria medicine, fungicide, adsorbent, deodorant, antistatic agent, shrinkage inhibitor, antioxidant, UV absorbent, far-infrared generating substance, etc. are mentioned. As adsorbent and a deodorant, inorganic substance, such as zeolite and tourmaline, ceramics, may be mentioned.

Foamed strands s1 and s2 are prepared using the above-mentioned components foamed with foaming agent. General manufacturing methods of foamed strand may be used for manufacturing the foamed strand of the present invention. For example, a method may be mentioned in which a foaming agent is mixed with a resin composition constituting foamed strand and the mixture is then foamed. As the formation method, the extrusion molding method is preferably used.

As foaming agents used for the above-mentioned foaming object, for example; inorganic foaming agents, such as carbon dioxide, nitrogen gas, and water; organic foaming agent, such as hydrocarbons, as pentane, isopentane, and butane, and chlorinated hydrocarbons, as fron, alternatives for chlorofluorocarbon, methylene chloride, and methyl chloride

may be mentioned. Moreover, as chemical reactive type foaming agents, for example, sodium hydrogencarbonate, mixture of inorganic substances, such as sodium hydrogencarbonate and acid, azo compounds, nitroso compounds, triazole compounds, etc. may be mentioned. These foaming agents may be used independently or two or more may be used together. When forming agents of high foaming magnification are required, it is preferable to use hydrocarbons, such as pentane and butane, and fron, carbon dioxide, nitrogen gas, and water, etc.

The amount of combination of a foaming agent used in manufacturing a foamed strand is not especially limited, but is suitably set according to a kind of the foaming agent to be used or to a desired foaming magnification, etc. Although a foaming magnification of the foamed strand is not either limited especially, it is preferable 5 to 100 times and more preferably 20 to 70 times. A small foaming magnification causes decrease in elasticity, and an excessive foaming magnification tends to induce decrease in strength. In the above-mentioned foamed object, additionally, inorganic substances, such as talc, calcium carbonate, aluminum hydroxide, and boric acid, may be used as a cellular regulator. The amount of the above-mentioned cellular regulator used is not especially limited.

In molding of foamed strands s1 and s2 by the present

invention, molding conditions, such as extrusion conditions, are not especially limited, and the combination method of each component is not limited, either. Each component is simultaneously or in consecutive order blended and is mixed accompanied by heating at the time of molding. As mixing method, general stirring system may be used. After mixing each component together and molded into desired form, such as the shape of a pellet, a foaming process may be carried out.

As a manufacturing method of foamed strands s1 and s2, a tandem extruding machine in which two sets of extruding machines are combined in series is used. The said thermoplastic resin and a cellular regulator are supplied to the first extruding machine and a foaming agent is injected in from a middle path of the first extruding machine to obtain a foaming molten mixture. The molten mixture is cooled in the second extruding machine to a suitable temperature for formation of air bubbles, and subsequently this molten mixture is extruded under atmospheric pressure from nozzles attached at the tip of the extruding machine to obtain foamed strands.

Out nozzle 9 and in nozzle 10 of Fig. 7 (b) are attached in a nozzle, and manufacturing of strands is performed. A form of nozzles is not especially limited. That is, in nozzle 4 and out nozzle 3 in the tip of a rotating dice are rotated

in the different direction mutually, and a foamed net in a meshed shape is obtained. After a net taking-up machine takes up the foamed net 1 obtained, the net 1 is cut into specified size. Moreover, it is also possible to give the strands slits at the time of extrusion, to obtain a specified size after taken up by a taking up belt followed with cutting process.

[Another Embodiments]

As a pair of outer clothes constituting surface material of textile B, a pair of outer material 11 and 11 or a pair of cloth 12 and 12 may be used, other than a pair of outer material 11 mentioned above and lining cloth 12. And moreover a constitution in which interior material of one layer or two or more are laminated in the foamed net 1 side of the outer material 11 or lining cloth 12 may also be used, and various modification is possible for thickness, number, quality of the material, kind, etc. When a high waterproof property is required, waterproofing treatment is preferably given by applying synthetic resin onto the outer material 11 and lining cloth 12. In addition, bags, such as rucksack, footwear, pole case, etc. are mentioned as goods utilizing buoyancy of clothing material B.

In foamed net 1 contained in textile B, following (1) to (8) are mentioned as examples of another cross section

form of foamed strands s1 and s2.

(1) As shown in Fig. 9 (a), a shape of character T and of inversed character T.

(2) As shown in Fig. 9 (b), a shape of character L and of inversed character L.

(3) As shown in Fig. 9 (c), the cross section form of the first foamed strand s1 is a shape of character T, and the cross section form of the second foamed strand s2 is a shape of a straight line (a shape of character I).

(4) As shown in Fig. 9 (d), the cross section form of the first foamed strand s1 is a shape of character L, and the cross section form of the second foamed strand s2 is a shape of a straight line (a shape of character I).

(5) As shown in Fig. 10 (e), a shape of character V and of inversed character V.

(6) As shown in Fig. 10 (f), a shape of character U and of inversed character U.

(7) As shown in Fig. 10 (g), a shape of character Y and of inversed character Y.

(8) As shown in Fig. 10 (h), the cross section form of the first foamed strand s1 is a shape of an ellipse with larger height than width, and the cross section form of the second foamed strand s2 is a shape of an ellipse with larger width than height.

Also in all of these foamed strands s1 and s2 with a

cross section form shown in Fig. 9 or Fig. 10, a ratio S of height size to width size of those cross sections is set as $1 < S$ ($W < H$), namely a height size H is larger than a width size W. Moreover, as shown in Fig. 10 (h), only one strand of a pair of foamed strands s1 and s2 may have a larger height than width.

When a foamed net 1 used for clothing material (textile) B of the present invention is in contact with another object and an external force orthogonal or almost orthogonal to a face 2 of a net is given, the net is configured and constituted so that compression deformation of the foamed strands s1 and s2 may be carried out in longitudinal direction as cross section form. That is, deformation is performed equally in right and left direction, without deformation in transverse direction of cross section form, when the compression direction load is given. A form shown in Fig. 9 (d) may also be used that has a flat upper surface and can be deformed in orthogonal or almost orthogonal to a face 2 of a net without being turned over, besides a bilaterally symmetrical form, such as an elliptical form shown in Fig. 1, Japanese hand drum form shown in Fig. 4, and character T form shown in Fig. 9. All constitutions that have a shape of character V, character U, or character Y shown in Fig. 10 and constitutions shown in Fig. 9 mentioned above that has a cross section form having a larger height size H than a width size W are defined

as "constitution in which a longitudinal direction as cross section form is orthogonal or almost orthogonal to a face of a net in a shape of mesh".

Example 1

(1) Molding machine: 40 to 50 mm tandem extruder

(2) Material: polyethylene (product by TOSOH Corporation, MFR 24) 100 weight parts

(3) Cellular regulator: (Eiwa Chemicals, EE205) 1.0 weight parts

(4) Foaming gas: butane

(5) Nozzle: Form of Fig. 7 (b) (a form from which product of Fig. 3 is obtained) 250H (the number of strands)

A foamed net with closed cell and with 1m of width was obtained using the above-mentioned apparatus and materials of (1) to (5). In addition, a cross section form of the foamed strand is shown in Fig. 3, a whole form is shown in Fig. 2, and size etc. is shown in Table 1.

Comparative Example 1

The same method as Example 1 was followed except that a nozzle of Fig. 13 [a nozzle that gives a form in Fig. 11 (a)] and 250 H (the number of strands) was used to obtain a net with closed cell and with 1m of width.

Table 1

	Foamed strand size		Foaming magnification	Buoyancy (kg/m^2)	Area (m^2/7.5kg)
	w	h2			
Example 1	2.5	4.7	34 times	4.4	1.71
Comparative Example 1	ϕ2.5		34 times	2.9	2.59

In Example 1, a product of foamed strand with a form shown in Fig. 3 that has a ratio of height size to width size of h/w = 1.88 was obtained, and in Comparative Example 1 a cylinder of diameter 2.5 was obtained. Both of the products had the same foaming magnification. In Example 1 a foamed net 1 having buoyancy with 1.52 times as much as in Comparative Example 1 was obtained. In order to acquire a buoyancy of 7.5 kg per one piece of life vest (a buoyancy standard of a life vest), in Example 1 only 66 % of area of the product in Comparative Example 1 was required. At the same time the predetermined buoyancy was obtained without lamination processing.

In any clothing material according to claim 1 to claim 4, cross section forms of foamed strands in foamed nets contained as main material are set so that a height size in a direction orthogonal or almost orthogonal to a face of a net is larger than a width size. An improvement in warmth retaining property (heat insulating property), buoyancy, flexibility, and cushioning property is attained, without spoiling productivity and with little or no increase in cost

and weight using the above-mentioned methods. Clothing materials especially suitable for a life jacket in which buoyancy and compact volume is required, and for a sportswear in which outstanding warmth retaining property is required are provided.

In a clothing material according to claim 2, outstanding buoyancy and warmth retaining property are obtained. And in a textile according to claim 3, a lining cloth side (skin side) with a good feeling is given, and as a result a material suitable for clothes with excellent feeling of wearing is obtained. In textile according to claim 4, a possibility of buckling of a foamed net by an external force is almost overcome, a possibility of getting out of shape as garment product is decreased, and improved buoyancy, warmth retaining property, flexibility, and cushioning property are effectively demonstrated.